

1     Claims

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3     1.     Well treatment apparatus comprising a cutting  
4     tool; a sealing device to seal a portion of a  
5     wellbore; and an anchor means to anchor the  
6     apparatus with respect to the wellbore.

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8     2.     Well treatment apparatus as claimed in claim  
9     1, wherein the sealing device comprises at least one  
10    annular cup-type device.

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12    3.     Well treatment apparatus as claimed in claim 1  
13    or claim 2, adapted to attach to a drillstring.

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15    4.     Well treatment apparatus as claimed in claim  
16    3, wherein the sealing device is adapted to, in use,  
17    seal the annulus between the drillstring and the  
18    innermost casing of the wellbore.

19

20    5.     Well treatment apparatus as claimed in claim  
21    4, wherein the cup device has a cup-shaped body and  
22    a part of the cup device is adapted to deform  
23    outwards to seal the annulus upon the application of  
24    pressure from inside the cup-shaped body.

25

26    6.     Well treatment apparatus as claimed in any  
27    preceding claim, wherein the sealing device  
28    comprises more than one annular cup device, at least  
29    two of the annular cup devices being orientated in  
30    the same direction to provide a double seal between  
31    the portion of the wellbore beneath the sealing  
32    device and the surface of the wellbore.

1     7.     Well treatment apparatus as claimed in any  
2     preceding claim, wherein the sealing device  
3     comprises more than one annular cup device and at  
4     least two of the annular cup devices are orientated  
5     in opposite directions to seal the portion of the  
6     apparatus in between the two oppositely-orientated  
7     devices from the rest of the bore.

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9     8.     Well treatment apparatus as claimed in claim  
10    7, wherein at least one fluid-circulation device is  
11    located between the two oppositely-orientated cup  
12    devices.

13  
14    9.     Well treatment apparatus as claimed in any  
15    preceding claim, wherein a fluid-circulation device  
16    is located below the sealing device.

17  
18    10.    Well treatment apparatus as claimed in any  
19    preceding claim, including at least one further  
20    sealing device at the downhole end of the apparatus,  
21    the further sealing device being adapted to seal the  
22    portion of the borehole in which the rest of the  
23    apparatus is located from the portion of the  
24    borehole below the apparatus.

25  
26    11.    Well treatment apparatus as claimed in any  
27    preceding claim, wherein the cutting tool comprises  
28    a jet cut nozzle capable of cutting through wellbore  
29    casing, capable of rotation through 360°, and  
30    capable of rotation in at two perpendicular planes.

31  
32    12.    Well treatment apparatus as claimed in any

1 preceding claim, wherein at least one part of the  
2 anchor means is laterally extendable.

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4 13. Well treatment apparatus as claimed in claim  
5 12, wherein the laterally extendable part of the  
6 anchor means has a high-friction surface for  
7 engaging the casing.

8

9 14. Well treatment apparatus as claimed in claim  
10 12 or claim 13, wherein the anchor means has a  
11 radial casing-contacting surface.

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13 15. A method of treating a well, including the  
14 steps of:

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16 inserting well treatment apparatus into a cased  
17 wellbore, the apparatus including a cutting  
18 tool, a sealing device and an anchor means;

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20 perforating the innermost casing in two  
21 vertically spaced positions; and

22

23 injecting cement into a portion of the annulus  
24 between the two innermost casing strings to  
25 seal the annulus;

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27 whereby the method includes the step of using  
28 the anchor means to anchor the apparatus to the  
29 cased wellbore.

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31 16. A method as claimed in claim 15, including the

1 step of pressure-testing the innermost casing before  
2 the first perforation is made by injecting a fluid  
3 into the wellbore below the sealing means.  
4

5 17. A method as claimed in claim 15 or claim 16,  
6 including the step of pressure testing the annulus  
7 before the second perforation is made by injecting a  
8 fluid into the wellbore below the sealing means and  
9 measuring the equilibrium rate of pumping as the  
10 fluid flows through the first perforation into the  
11 annulus.  
12

13 18. A method as claimed in any of claims 15 to 17,  
14 including the step of pressure testing the annulus  
15 after the second perforation has been made by  
16 injecting a fluid into the annulus to check that  
17 there are no blockages in the part of that annulus  
18 lying between the vertically spaced perforations.  
19

20 19. A method as claimed in any of claims 15 to 18,  
21 wherein the sealing device includes two oppositely-  
22 orientated cup devices, and the cement is injected  
23 into the annulus from an aperture in the apparatus  
24 located between these two cup devices.  
25

26 20. A method as claimed as claimed in any of  
27 claims 15 to 19, including the step of pressure  
28 testing the sealed annulus by positioning the  
29 apparatus so that the sealing device lies between  
30 the two vertically spaced perforations and by  
31 injecting fluid into the wellbore below the sealing  
32 device.

1     21.    A method as claimed in any of claims 15 to 20,  
2     including the step of using the cutting tool to  
3     sever the casings above the perforations after the  
4     annulus has been sealed.

5  
6     22.    A method as claimed in any of claims 15 to 21,  
7     the method including the step of undertaking at  
8     least one pressure test by injecting fluids, whereby  
9     during the pressure test, the apparatus is anchored  
10    to the casing by the anchor means to counter the  
11    upwards force on the apparatus by the injected  
12    fluids.

13  
14    23.    A method as claimed in any of claims 15 to 22,  
15    wherein the well treatment apparatus is mounted on a  
16    drillstring and is manoeuvred in the wellbore by  
17    raising and lowering the drillstring.

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